

PAPERS READ.

NOTES ON SOME SPECIMENS OF PLANTS COLLECTED
AT KING GEORGE'S SOUND BY MR. H. WILLIS.

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Some time since I forwarded to the Linnean Society, with Notes, 38 specimens of plants collected at King George's Sound by the Rev. R. Collie, F.L.S., and in so doing I endeavoured to explain, by the assistance of my late friend Mr. C. S. Wilkinson, F.G.S., the probable reason why the flora of Western Australia differs so much from that of the eastern portion of the continent. That eminent geologist was of opinion that, during the Miocene period, the condition of Australia was very different from what it now is, as probably the *ocean occupied all that low country between Spencer's Gulf and Western Australia*; whilst during the Cretaceous period about *two-thirds of Australia must have been under the ocean*. Supposing, therefore, that Eastern and Western Australia at some very remote period were separated by water, and that, in the course of many generations, the conditions of soil and climate have been considerably modified in both regions, it may be presumed that the western or purely Australian plants became very much localised, whilst the eastern flora, in addition to the few species which have immigrated to it from the west, has been mixed with plants of an Asiatic or Polynesian type. An examination of 35 species, which have recently been collected at King George's Sound, will show how few have travelled eastwards:—

(1) DILLENIACEÆ.

1. *Hibbertia furfuracea*, Benth.

(2) POLYGALÆÆ.

2. *Comesperma confertum*, Labill.

(3) TREMANDREÆ.

3. *Tetratheca setigera*, Lindl.

(4) RUTACEÆ.

4. *Boronia crenulata*, Sm.
5. *B. heterophylla*, F.v.M.

(5) GERANIACEÆ.

6. *Pelargonium Rodneyanum*, Lindl.

(6) STERCULIACEÆ.

7. *Thomasia quercifolia*, J. Gay.

(7) THYMELEÆ.

8. *Pimelea rosea*, R.Br.
9. *P. imbricata*, R.Br.

(8) LEGUMINOSÆ.

10. *Isotropis striata*, Benth.
11. *Oxylobium callistachys*, Benth.
12. *Chorizema angustifolium*, Benth.
13. *Burtonia scabra*, R.Br.
14. *Daviesia flexuosa*, Benth.
15. *Eutaxia myrtifolia*, R.Br.
16. *E. virgata*, Benth.
17. *Vicia angustifolia*, Roth. (introduced).
18. *Acacia hastulata*, Sm.

(9) MYRTACEÆ.

19. *Melaleuca thymoides*, Labill.
20. *Agonis linearifolia*, Schau.

(10) UMBELLIFERÆ.

21. *Xanthosia rotundifolia*, DC.

(11) PROTEACEÆ.

22. *Adenanthos obovata*, Labill.
23. *A. barbiger*, Lindl.

(12) COMPOSITÆ.

24. *Helipterum Manglesi*, F.v.M.
25. *Helichrysum bracteatum*, Willd.

(13) GOODENIACEÆ.

26. *Dampiera alata*, Lindl.
27. *D. leptoclada*, Benth.

(14) SOLANACEÆ.

28. *Anthocercis viscosa*, R.Br.

(15) EPACRIDÆ.

29. *Andersonia sprengelioides*, R.Br.
30. *Astroloma compactum*, R.Br.
31. *Lysinema fimbriatum*, F.v.M.
32. *Leucopogon carinatus*, R.Br.
33. *Dracophyllum capitatum*, R.Br.

(16) HÆMODOURACEÆ.

34. *Conostylis setigera*, R.Br.

(17) JUNCACEÆ.

35. *Xerotes micrantha*, Endl.

(1) The genus *Hibbertia*, according to Baron Mueller's census, contains 87 species, and of these one half are purely western plants, and have never emigrated from that Colony. Only one, *H. stricta*, R.Br., is common to the Australian Colonies and Tasmania. *H. furfuracea*, Benth., or *Pleurandra furfuracea*, R.Br., is strictly a western species, and not nearly allied to any of the eastern species. Though the flowers resemble those of *H. diffusa*, R.Br., the two plants are very distinct in habit, the one

being an erect shrub of several feet in height, and the other being a small prostrate plant, whilst the position of the stamens and the number of the carpels differ materially.

(2) *Comesperma confertum*, Labill., is peculiar to W. Australia, though in appearance it resembles *C. ericinum*, DC., which is common to the eastern Colonies and Tasmania, and has the keel-petal horned and the sepals not obtuse. Of the 24 species of the genus 16 occur in W. Australia, 11 being peculiar to that Colony, and the other 5 extending to S. Australia, Victoria, N. S. Wales, Queensland and Tasmania. *C. scoparium*, Steetz, *C. volubile*, Labill., and *C. calymega*, Labill., are the only species which have travelled from the west to N. S. Wales.

(3) *Tetralthea setigera*, Endl., belongs to a genus almost exclusively W. Australian, only two species, *T. ericifolia*, Sm., and *T. juncea*, Sm., being known in E. Australia, and these so different in character from the majority of the species as to suggest a long series of ages for their differentiation, that is to say, presuming that the genus which is strictly Australian had its origin in the western part of the continent. Of the small order Tremandreae, the genera *Platytheca* and *Tremandra* are unknown in the east, as well as any species of *Tetralthea* which have the ovules solitary in each cell, and seeds glabrous and shining.

(4) Of the genus *Boronia*, which is known to have about 60 species in Australia (Census, F.v.M.), more than half (33) are limited to the west. *B. serrulata*, Sm., is peculiar to N. S. Wales, but it is nearly allied to *B. crenulata*, Sm., differing chiefly in its larger and more numerous flowers, the structure of its style, and the hairiness of its filaments. *B. heterophylla*, F.v.M., belongs to a section of the genus exclusively western, and is characterised by having the sepaline anthers different from the petaline ones. The well known *B. megastigma*, Nees, is of the same section. Whilst the species of *Boronia* are almost equally divided between the west and east, N. S. Wales has a much larger share of the species of *Eriostemon* and *Phebalium*, and it is remarkable that only one species, *E. difformis*, Cunn., is common to the Australian

colonies. Some genera of the Rutaceæ are endemic in the east, and others are common to that part of Australia, tropical Asia, and the isles of the Pacific.

(5) *Pelargonium Rodneyanum*, Lindl., is not peculiar to W. Australia, as it occurs in Victoria, N. S. Wales, and S. Australia. In Mitchell's Expeditions, vol. ii. p. 144, it is stated that near the Murray he discovered "a beautiful new species of the Cape Pelargonium, which would be an acquisition to our gardens." This he named "*P. Rodneyanum* in honour of Mrs. Riddell, of Sydney, granddaughter of the famous Rodney." Baron Mueller has figured this species amongst his Victorian plants. Perhaps it may be regarded as one of those plants which had their origin in Africa (a region famous for its Pelargoniums), as Mr. Bentham considered it nearly allied to *P. reniforme*, Curt., from the southern part of that continent.

(6) *Thomasia quercifolia*, J. Gay, with 19 species of the genus is of western origin, and only one species, *T. petalocalyx*, F.v.M., and that nearly approaching *T. angustifolia*, Steud., has travelled to S. Australia and Victoria. Of the Sterculiaceæ, numbering 126 species, more than half (66) are endemic in W. Australia (Census, F.v.M.), but the following genera are not represented in that region, viz: *Sterculia*, *Tarrietia*, *Heritiera*, *Ungeria*, *Helicteres*, *Methorium*, *Melhania*, *Melochia*, *Dicarpidium* and *Abroma*.

7) *Pimelea rosea*, R.Br., and *P. imbricata*, R.Br., with 21 other species of the genus, are limited to W. Australia. According to Mr. Bentham, *Pimelea* occurs only in Australasia; one species, *P. longifolia*, Banks and Sol., being common to Australia and New Zealand, and 9 others peculiar to the latter. *Drapetes*, *Wickstræmia* and *Phaleria* do not occur in W. Australia; but *Drapetes* is represented in Tasmania and Victoria as well as in New Zealand, whilst the others have species in the Oriental Archipelago, the isles of the Pacific and E. Australia.

(8) Of the great order Leguminosæ comprising 1065 species (Census, F.v.M.) more than a third are endemic in W. Australia,

and the following genera do not extend to any of the other colonies, viz: *Jansonia*, *Latrobea*, *Euchilopsis* and *Labiichea*.

- (a) *Isotropis striata*, Benth. This species and 4 others are limited to W. Australia. Only one extends to S. Australia and N. S. Wales.
- (b) *Oxylobium callistachys*, Benth., formerly *Callistachys lanceolata*, Vent., is an ornamental plant, and differs in appearance from the species generally. Of the genus, 17 are peculiar to W. Australia, and 7 occur in N. S. Wales.
- (c) *Chorizema angustifolium*, Benth., with 13 species of the genus, is limited to W. Australia. *C. parviflorum*, Benth., is the only one which extends to the east.
- (d) *Burtonia scabra*, R.Br., belongs to a genus principally western.
- (e) *Daviesia flexuosa*, Benth., is one of a large genus, 41 species of which are limited to the west, and 13 occur in N. S. Wales.
- (f) *Eutaxia myrtifolia*, R.Br., and *E. virgata*, Benth., are western species. *E. empetrifolia*, Schl., is common to W. and S. Australia, Victoria, and N. S. Wales.
- (g) *Vicia angustifolia*, Roth., is an introduced plant.
- (h) *Acacia hastulata*, Sm., is a small shrub known only from King George's Sound.

(9) *Melaleuca thymoides*, Labill. The genus *Melaleuca* has in all Australia 101 species, about 70 of which are western and 18 occur in N. S. Wales. *Agonis linearifolia*, Schau., resembles a *Leptospermum*. When the *Flora Australiensis* was published, *Agonis* was regarded as peculiarly western; but Mr. F. M. Bailey discovered one in Queensland (1888) *A. lysicephala*, F.v.M.; and *A. Scortechiniana* is found to be common to N. S. Wales and Queensland (1881).

(10) *Xanthosia rotundifolia*, DC., differs very much from the species near Sydney, as it is nearly glabrous. The genus is confined to Australia, 13 being western and 5 eastern species. Three extend to Tasmania.

(11) *Adenanthos obovata*, Labill., and *A. barbiger*, Lindl., are Proteaceous shrubs. With two exceptions the species (14) are limited to W. Australia. The genus is remarkable for its peculiar style, and is not closely allied to any other.

(12) *Helichrysum bracteatum*, Willd., is a composite found in all the Australian colonies, and with *Helipterum Manglesii*, F.v.M. (*Rhodanthe Manglesii*, Lindl.), is often seen in gardens.

(13) *Dampiera alata*, Lindl., and *D. leptoclada*, Benth., belong to a genus comprising 38 species, of which 27 are limited to W. Australia. Only seven occur in N. S. Wales and one in Tasmania.

(14) *Anthocercis viscosa*, R.Br., with eight other species, is limited to W. Australia, and has the reputation of being poisonous. Four species are found in N. S. Wales and one in Tasmania. The genus *Anthocercis* is nearly allied to *Duboisia*, of which *D. Hopwoodii*, F.v.M., is the famous "Pitury" of the blacks. According to Mr. F. M. Bailey, F.L.S., they chew the leaves of it as white men do tobacco.

(15) (a) The genus *Andersonia* is limited to W. Australia and has 20 species. *A. sprengelioides*, R.Br., is very common at King George's Sound.

(b) *Astroloma compactum*, R.Br. (referred by Baron Mueller to *Styphelia*), is nearly allied to *A. humifusum*, R.Br., a species found in most of the Australian colonies. According to the Flora, there are 18 species of the genus, three only extending to the East.

(c) *Lysinema fimbriatum*, F.v.M., is remarkable with the other four species of this western genus for having its filaments free from the base.

(d) *Leucopogon carinatus*, R.Br., belongs to the section "Striate" of the genus. The Baron joins *Leucopogon* with *Styphelia*, but according to the Flora it reckons 120 species, of which 78 are western. It is worthy of remark that *L. Richei*, R.Br., a species growing near the coast, is common to five of the Australian colonies and Tasmania.

(e) *Dracophyllum capitatum*, R.Br., occurs only in W. Australia, to which may be added *D. squarrosum*, R.Br., *D. Drummondii*, Benth., *D. phlogiflorum*, F.v.M., *D. gracile*, R.Br., and *D. parviflorum*, F.v.M. Two species are indigenous in Tasmania, one in Queensland, and one (*D. Fitzgeraldi*, F.v.M.) in Lord Howe's Island.

(16) *Conostylis setigera*, R.Br., belongs to a genus having 32 species, all peculiar to W. Australia. It is worthy of notice that the only species of Hæmodoraceæ in N. S. Wales are *Hæmodorum planifolium*, R.Br., and *H. teretifolium*, R.Br.

(17) *Xerotes micrantha*, Endl., is a species found in S. and W. Australia, Victoria, and N. S. Wales. The genus comprises 32 species, of which 19 are limited to W. Australia and 11 occur in N. S. Wales. The only *Xerotes* found out of Australia is one in New Caledonia.

It is remarkable, on looking over a few specimens gathered promiscuously at King George's Sound, that *Pelargonium Rodneyanum*, *Vicia angustifolia*, *Helichrysum bracteatum*, and *Xerotes micrantha* are the only species found on the eastern part of the continent, and of these one is probably of African and the other of European origin. The rest of the species stand, as it were, isolated, and illustrate the remark of Sir J. D. Hooker that, in reference to the flora of Australia, "there is a greater specific difference between two quarters of Australia (South-eastern and South-western) than between Australia and the rest of the globe; and that the most marked characteristics of the flora are concentrated at that point which is geographically most remote from any other region of the globe." Western Australia is rich in the number of its species. Baron Mueller reckons 3560, and of these the great majority are "purely Australian, without any admixture of any other element," whilst in the eastern colonies the number of such plants is proportionately less. It appears, therefore, that in Western Australia the flora of the continent had its origin, and that whilst certain species have migrated to the east, they have become associated with those from other parts. Why so few

species, comparatively speaking, have left their original source is a problem not yet solved, and it is doubtless the result of causes which remain to be explained in reference to geological periods long past. Whatever may be the cause, it is a fact that in the great orders Leguminosæ, Myrtaceæ and Proteaceæ, many of the western genera are either wholly unrepresented or only partially represented in the east. For instance, the large genera *Gastrolobium* and *Jacksonia* have very few species out of Western Australia, whilst at least four genera are not represented in any other part of Australia. In the Myrtaceæ, also, a similar unequal distribution appears. The large genus *Verticordia*, with the exception of one species in Queensland and Northern Australia, is exclusively western; and *Calycotrix*, with its numerous species, has only two representatives in N. S. Wales. *Actinodium*, *Pileanthus*, *Wehlia*, *Astartea*, *Hypocalymma*, *Balaustion*, *Conothamnus*, *Regelia*, *Phymatocarpus*, *Calothamnus*, *Lamarchea* and *Eremæa* are limited to the west; and in *Eucalyptus* not more than six or seven species are common to both regions. Again, in the Proteaceæ, *Simsia*, *Synaphea*, *Franklandia*, and the large genus *Dryandra*, no species have migrated eastward; whilst in *Petrophila*, *Isopogon*, and *Banksia*, the eastern species are few. In the large order of the Compositæ, 206 occur in the west and 296 in N. S. Wales. Only three genera, with one species each, viz., *Pithocarpa*, *Decazesia* and *Trichocline*, are peculiar to W. Australia. It must be remarked in reference to this order that the species are more widely distributed than any other, being easily conveyed by the nature of their seeds, and being in many instances mere weeds suited to all climates. Notwithstanding these considerations, however, many of the western species are truly local, whilst the number of the eastern composites has been augmented by plants from Asia, Australasia and Polynesia. In the Epacrideæ, *Oligarrhena*, *Needhamia*, *Conostephium*, *Coleanthera*, *Lysinema*, *Cosmelia*, *Sphenotoma* and the large genus *Andersonia*, nine of the species occur in the East; whilst amongst Monocotyledonous plants, all the species of the Hæmodoraceæ, with the exception of very few, are strictly limited to the west. It would be easy to pursue the

subject further, and to show from Baron von Mueller's valuable "Census of Australian Plants" (to which I am so much indebted for the numbers and distribution of species) how correctly Sir J. D. Hooker concluded, more than thirty years ago, that Western Australia is the centrum and cradle of plants purely Australian, and that in Eastern Australia the flora is not so rich in endemic species, or so free from an admixture of such as may be regarded as of foreign origin. At the present time it is impossible to explain these phenomena, but it is probable that the progress of geological science may hereafter bear testimony to the causes which have led to the differentiation of the Australian flora.

NOTE.—Since these remarks were written, I have received from the same locality *Banksia coccinea*, R.Br., *B. attenuata*, R.Br., *B. ilicifolia*, R.Br., *Callistemon speciosus*, DC., and *Scævola attenuata*, R.Br., none of which species extend to Eastern Australia.